India, presented by Mrs. Aspinwall; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. Richard Schott y Larios; a Duyker Bok (*Cephalophus mergens*) from Natal, presented by Mr. J. D. Witherspoon; a Hairy-rumped Agouti (*Dasyprocta prymnolopha*) from South America, presented by Mrs. Booth; a Spring Bok (*Gazella euchore*) from South Africa, purchased; a White-throated Capuchin (*Cebus hypoleucus*) from Central America, three Rough-legged Buzzards (*Archibuteo lagopus*), European, deposited; a Long-nosed Crocodile (*Crocodilus cataphractus*) from West Africa.

SCIENTIFIC SERIALS

Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien, vol. xxv. The following papers are published in this volume: On some new species of *Mycetophilidæ* from the neighbourhood of Sandez (Galizia), by Dr. A. Grzegorzek.—On the structure of the muscular cells and on the general structure of *Mnestra parasites*, Krohn, by Prof. C. Claus.—On some new and some insufficiently known species of *Cecidomyidæ* of the Vienna district, by Dr. Franz Löw.—On the relations of the African and Indo-Malayan bird-fauna, with some general remarks on the geographical distribution of mammals, by A. von Pelzeln.—On Hungarian fungi (third treatise: *fungi hypogæi*), by Prof. A. Haszlinsky.—Description of new and insufficiently known *Phryganidæ and Oestridæ*, by Dr. Fr. Brauer.—Mycological notes, by S. Schulzer von Müggenburg.—*Hemiptera Heteroptera Austriaca*, MM. Maji.—Augusti, 1870, a J. A. Palmén collecta, by O. M. Reuter.—On some new *Lepidoptera* of the South American fauna, by Dr. O. Staudinger.—Second note on the Arachnida-order of *Territelariæ* Thorrell (Mygalidæ Autor.), by Dr. Anton Ausserer. This is one of the most elaborate papers in the volume. On North-American moths, specially *microlepidoptera*, by Prof. P. C. Zeller; this is equally elaborate.—Notes on Adriatic echinoidæ, by Dr. E. von Marenzeller.—On the vegetation-formations of the Taurian peninsula and its climatic conditions, by Dr. A. Rehmann.—Researches on the *Diptera*-fauna of Austria, by Josef Palm.—On the ornithological fauna of Moravia, by F. von Dalberg.—On the occurrence of *Salix babylonica, L., androgyna et masculina* in Austria, by J. E. Hibsch.—Lichenological excursions in the Tyrol, by F. Arnold.—On some species of *Salix* new in the "Wechsel" district (Lower Austria), by E. Woloszczak.—Researches on land-*Isopoda*, by C. von Vogl.—On some species of *Spermophilus*, by Ernst Schauer.—On the fungi-flora of Bohemia, by F. von Thümen.—On the occurrence of short-eared *Arvicolæ* near Vienna, by Prof. L. H. Jeitteles.—On thermal constants and the power of accommodation in the vegetable kingdom, by Prof. H. Hoffmann.—Remarks on some ferns from the island of Celebes, by M. Kuhn.—Botanical excursions in Italy, by Dr. C. von Marchesetti.—Researches on some parasites infecting the hop plant, producing mildew and "kupferbrand" (copperburn), by Wilh. Voss.—Second paper, containing additional remarks on the *Cecidomyidæ* of the Vienna district, by Dr. Franz Löw.—Researches on *Æoiidiadæ*, by Dr. R. Bergh.—New researches on *Phyllidiadæ*, by the same.—European *Encyrtidæ*, considered biologically and systematically, by Dr. G. Mayr (this paper occupies some hundred pages).—Muscorum species nova, by J. Juratzka.—Symbolæ ad pteridographiam et Characeas Hungariæ præcipue Banatus, by Dr. V. de Borbás.—On some Lepidoptera, by A. F. Rogenhofer.—Researches made upon leaf galls and their causes on *Vitis vinifera*, by G. von Haimhoffen.—Six years' observations on the first appearances both in the animal and vegetable kingdoms at New Cologne near Milwaukee (North America), by Th. A. Bruhin.—On the flora of Lower Austria (second paper), by J. Wiesbaur.

Poggendorff's Annalen der Physik und Chemie, No. 9, 1876.—This contains the following papers:—Experimental researches on liquid-friction in salt solutions, by M. Sprung.—On the summer rain season of Germany, by M. Hellmann.—Observation of the retardation in the progress of the induction current by means of tuning-fork apparatus, by M. v. Ettingshausen.—On the passage of strong induction currents through liquids, by M. Herwig.—Contributions to electrodynamics, by M. Wand.—On the dependence of the electric conductivity of selenium on heat and light; the photography of tones, by M. Stein.—On the dependence of the specific heat of mercury on the temperature, by M. Winkelmann.—An interesting aërostatic experiment, by M. Reauleaux.—On the theory of double refraction, by M. v. Lang.

THE *Naturforscher* for October, 1876, contains the following papers of interest:—On the specific power of substances in solution, to turn the plane of polarisation, by H. Landolt.—On the uneven surface of meteorites, by M. Daubrée.—On the nature of milk globules and the formation of butter, by F. Soxhlet.—On some phenomena in the combustion of gases, by Herr Horstmann.—Note on the germ-leaf theory in botany, by Herr Famintzin.—On the action of carbon bisulphide as a means for conserving animal and vegetable substances, by Phil. Zöller.—On the absorption of carbonic acid by saline solutions, by J. Setschenow.—On the explosion-limits of mixtures of combustible gases with oxygen or atmospheric air, by A. Wagner.—On the first appearance of the plants now living during geological periods, by Herr de Saporta.—On the deep-sea temperatures in the South Pacific and the circulation of waters from ocean to ocean; speculative remarks based upon the results of the *Gazelle* Expedition sent out by the German Government, by Herr von Schleinitz.—On the chemical composition of leaves, according to the age and species of trees, by P. Fliche and L. Grandeau.—Hypothesis on the nature of the soft aggregate state of matter, by L. Pfaundler.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, November 8.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—Melville Attwood, San Francisco, and R. W. Moore, Whitehaven, were elected Fellows of the Society.—The following communications were read:—A short notice of a new exposure of rhætics near Nottingham, in a letter from E. Wilson, F.G.S., dated November 3, 1876.—Note on the Red Crag, by W. Whitaker, F.G.S.—On the Kessingland Cliff Section, and the relation of the forest-bed to the Chillesford Clay, with some remarks on the so-called terrestrial surface at the base of the Norwich Crag, by F. W. Harmer, F.G.S.—Observations on the geology of East Anglia, &c., by S. V. Wood, jun., F.G.S., and F. W. Harmer, F.G.S., &c. The subjects discussed in this paper were threefold, viz.:—(1) The unfossiliferous sands of the Red Crag. (2) The unconformity between the Lower and Middle Glacial deposits. (3) The mode in which the Upper and Middle Glacial were accumulated. The views of the authors under the first head were similar to and confirmatory of those advanced in the previous paper by Mr. Whitaker; but they pointed out that the Red Crag, which these sands, in an altered form, represent, could not belong to the Chillesford division of that formation, by reason of the casts of shells which had been preserved not comprising any of the more characteristic Chillesford species, and of their including among them forms confined to the older portions of the Red Crag. They also pointed out that the Chillesford Clay had been removed over all the area occupied by these sands by denudation prior to the deposition of the Middle Glacial, which rests upon these sands wherever they occur. The removal of the Chillesford Clay, the authors consider, was due in part, if not in all, to the great denudation between the Lower and Middle Glacial, which gave rise to the unconformity discussed under the second head. This unconformity they illustrate by lines of section traversing most of the river valleys of Central and East Norfolk and Suffolk. These show that such valleys were excavated after the deposit of the Contorted Drift, and out of that formation and the beds underlying it. They also show that the Middle and Upper Glacial have been bedded into these valleys, as well as spread (the middle only partially, but the upper more uniformly) over the high grounds formed of contorted drift out of which they were excavated, and thus generally concealing that deposit, which manifests itself only in the form of occasional protrusions through these later formations, but which they consider constitutes, though thus concealed, the main mass of the two counties. The authors also describe a glacial bed as occurring at various localities in the bottom of some of these valleys, and which in one case they have traced under the Middle Glacial. This they regard as having been formed in the interval between the denudation of the valleys and their subsequent submergence beneath the Middle Glacial sea; and inasmuch as such valley-bed invariably rests on the chalk in a highly glaciated condition, they attribute its formation more probably than otherwise to the action of glaciers occupying the valleys during an inter-glacial interval of dry land. They also suggest that if this was so it is probable that that the forest and mammaliferous bed

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of Kessingland, instead of being coëval with the pre-glacial one of the Cromer coast, may belong to this inter-glacial interval—that is to say, to the earliest part of it, before the glaciers accumulated in the valleys, and when the climate was more temperate, any similar deposits in these inter-glacial valleys having been for the most part subsequently ploughed out by the action of the glaciers. In discussing the subject under the third head the authors point out the many perplexing features which are connected with the position and distribution of the Middle Glacial formation; and while they admit that as to one or two of these the theory which they offer affords no explanation, they suggest that the theory of this formation's origin which best meets the case is as follows, viz. :—As the country became re-submerged, and as the valley glaciers retreated before the advancing sea, the land-ice of the mountain districts of North Britain accumulated and descended into the low grounds, so that by the time East Anglia had become re-submerged to the extent of between 300 and 400 feet, one branch of this ice had reached the borders of the counties of Norfolk, Suffolk, Essex, Herts, and Bedford, ploughing out and destroying any lower glacial beds that had been deposited over the intervening counties upon which it rested, and over which we ought otherwise, having regard to the depth of the earlier submergence under which they were accumulated, to find them, but do not. The Middle Glacial formation, consisting of sand and gravel, they attribute principally to the action of currents washing out and distributing the morainic material, which was extruded on the sea-bottom by this land-ice; that ice itself, by keeping out the sea over all the country on which it rested, which was then below the sea-level, preventing the deposit of the Middle Glacial in those parts. The termination of this current action was accompanied by increased submergence and by a gradual retreat of the land-ice northwards to the mountain districts, until Britain was left in the condition of a snow-capped archipelago, from which eventually the snow disappeared and the land emerged. To the moraine extruded from the base of this ice and into deep water they refer the origin of the Upper Glacial Clay, the moraine material remaining partly in the position in which the ice left it, and partly lifted by the bergs which became detached from the ice. Such part of it as was lifted was dropped over the sea-bottom at no great distance from its point of extrusion, and in that way the marine shells occurring in a seam of sand in the midst of this clay at Dimlington and Bridlington on the Yorkshire coast became imbedded, the mollusca which had established themselves on the surface of this moraine material having been thus smothered under a lifted mass of the same, which was dropped from a berg. The authors point out that precisely in the same way in which the Middle Glacial is found stretching out southwards and eastwards beyond the Upper Glacial Clay in Suffolk and in Herts, and is succeeded by such clay both vertically and horizontally, so does the earlier-formed part of the Upper Glacial Clay, or that with chalk *débris*, stretch southwards beyond the later-formed part, or that destitute of such *débris*, and is succeeded by it, both vertically and horizontally. This, they consider, shows that the Middle and Upper Glacial deposits, which constitute an unbroken succession, were due to the gradually receding position of the land-ice during their accumulation, the sequence being terminated with the Moel Tryfaen and Macclesfield Gravels, which were accumulated during the disconnection and gradual disappearance of the ice, and while the land still continued deeply submerged.

Anthropological Institute, November 14.—Col. A. Lane Fox, F.R.S., president, in the chair.—The president read a paper on the Black Burgh Tumulus, Dyke Road, Brighton, explored by him in 1872. This tumulus, about two miles from another opened in 1856, which contained the amber cup, bronze dagger, &c., now in the Brighton Museum, was found to contain towards the centre a layer of charcoal 1′ 10″ below the surface, and extending to a radius of 20 feet. This, on being microscopically examined, was found to be oak charcoal. Portions of ribs of goat or sheep, notched apparently with a flint saw, were found, a piece of British pottery, and in the centre of the tumulus, in an oblong grave 8 feet by 12 feet, was found a skeleton in a crouching position, six feet below the surface, and crushed flat by the superincumbent earth, the face towards the south-east. These remains Prof. Flower ascribes to a female of about 5′.6″; about two feet from the feet lay a fine bronze dagger 4″ in length, with the rivets for attaching it to its handle. A curious food-cup with peculiar ornamentation on one side, and also two small discs of metal, apparently rivet-heads, together with a quantity of small flat beads, originally strung together, were found. These objects belong to the time of interment. Two flint scrapers were also found near the body. The chief peculiarities of this find are the presence of a dagger with a female skeleton and the curiously-ornamented food-cup. The president then read a paper on the exploration, in 1875, of the ditch and tumulus in Seaford Camp. In the ditch at 1 foot below the present surface were found one or two pieces of mediæval pottery, then Romano-British at about 3 feet, and below this chalk rubble evidently filled in, till the original bottom at 7 feet was found. The tumulus inside the rampart was examined, and a large flint scraper and a piece of British pottery were found at 2 feet. Below, at a depth of 3 feet 5 inches, five flint saws and more British pottery were found, also fragments of a flint hammer and a polished flint celt, originally 5 inches long, but broken into three pieces; one of the edges was chipped to make a new edge. The flint hammer was formed from a sea-worn flint pebble. The flint celt had evidently been fractured three or four times at the place of interment. Scrapers and fragments of pottery and a broken but well-shaped barbed arrow-head were also found. No trace of bone was found.—Mr. F. G. H. Price, F.G.S., then read a paper on excavations in the Romano-British cemetery at Seaford, Sussex, by himself and Mr. John E. Price, F.S.A. The authors described the cemetery and the cuttings they made in it. The surface soil, extending to a depth of about 3 feet, contained large quantities of flint scrapers, flakes, and fragments of pottery. Several urns were met with at a depth of 3 feet 6 inches from the surface, which contained, in addition to the usual calcined bones, thin iron nails with large heads, flint flakes, and bronze fibulæ. The objects found in the above excavations were exhibited, and a discussion on the three papers took place, in which the president and others joined. Maps and sections illustrated the papers.—Photographs of a so-called horned man from Akim were exhibited by Mr. Hay per Mr. Francis Galton, F.R.S.

Physical Society, November 18.—Prof. G. C. Foster, president, in the chair.—The following candidates were elected members of the Society:—Major W. Malcolm, R.E., Prof. J. M. Purser, Dr. W. Francis, Mr. G. Johnstone Stoney, and Mr. D. MacAlpin.—Mr. Tylor read a paper on the cohesion and capillary action of films of water under various conditions. The author endeavours to eliminate the action of all forces except that of gravity by immersing his "valves" in water. The models which he exhibited consisted of glass tubes about 3 inches in diameter and 6 inches high, filled with water and containing each a piston, which, on being raised, was capable of lifting by cohesion a heavy mass of metal, the nature of the surfaces in contact differing in the several instruments. From experiments with them he concludes that the time during which a heavy valve can be supported depends upon the size of the surface of contact, the difference of pressure within and without the moving parts, and the smoothness of the valve. On the contrary, dry bodies, such as Whitworth's surface planes, will adhere for an indefinite period. Mr. Tylor considers that the supporting of a body in water is due to a difference of pressure in the water itself, and he adduced Giffard's injector as showing that such differences can take place. He has also studied the form assumed by a drop of water at a tap, and considers that when a fly walks on a ceiling its weight acts in the same manner as the heavy valves in the models exhibited.—Prof. Shelley exhibited some of Sir Joseph Whitworth's surface planes and gauges, and showed their bearing on the subject.—Dr. Stone then projected on to the screen the spectra produced by the diffraction gratings, which he exhibited at the last meeting of the Society. When received on a screen at a distance of about 25 feet they showed bright bands in the red and violet, after transmission through a strong solution of permanganate of potash. Mr. Clarke has since ruled for him gratings on the backs of right-angled prisms, and Dr. Stone has cemented, by means of glycerine, or oil of cassia, gratings on glass and steel on such prisms. The lines were two thousand and three thousand to the inch.

Institution of Civil Engineers, November 21.—Mr. George Robert Stephenson, president, in the chair.—The paper read was on the fracture of railway tires, by Mr. W. W. Beaumont, Assoc. Inst. C.E.

Victoria (Philosophical) Institute, December 4.—Mr. C. Brooke, F.R.S., in the chair.—It was stated that the Society now numbered 713 members.—A paper on the Egyptian myth of Ra, by Mr. W. R. Cooper, was read.

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CAMBRIDGE

Philosophical Society, November 6, 1876.—Mr. J. W. L. Glaisher made a communication to the Society on a formula of Cauchy's for the evaluation of a class of definite integrals.—Prof. Hughes exhibited three series of specimens in illustration of the mode of (1) formation, (2) weathering, and (3) fracture of flint, the first two being selected chiefly with a view to the last. He produced proofs that the supposed faulted and re-cemented flints were generally only flint that had irregularly replaced jointed chalk, the formation of the flint being arrested by the joints. In the case of the banded flints he exhibited and distinguished two kinds—one in which infiltration had taken place all round the outside, often a good test of the drift origin of certain fragments; and the other in which a difference of texture, due generally to some included organism, had determined and limited the areas over which infiltration had produced bands of colour. He pointed out that these differently coloured included portions, whether banded or not, affected the fracture, as they also depended upon the texture of the flint, but that the bands themselves had little or no influence upon the fracture. He then drew attention to a series of specimens which showed that when flint or other material of a similar texture was struck by any object such as a round-headed hammer, so that the blow was symmetrically distributed over a small area, a bruise was produced which on weathering flaked off all round a small cone having an angle at its apex of about 110°, and that when the whole had flaked away a smooth basin was left. But if, and only if, the blow was sufficiently intense to break the flint up, this cone was found to truncate a larger cone whose apex had an angle of about 30°. He pointed out that modifications of this double cone structure explained the "rings" and "bulb of percussion" which were appealed to as evidence of the direction of blows on which arguments were founded as to the origin of some stone implements.

PARIS

Academy of Sciences, November 27.—Vice-Admiral Paris in the chair.—The following papers were read:—On the crystals of magnetic oxide of iron formed during the roasting of a spathic ore, by M. Boussingault.—On various works of hydraulics, executed by the ancients in the environs of Rome, by P. Secchi. He notices, shortly, an inverted siphon aqueduct at Alatri, a complete system of drainage there, mode of supplying purified rain-water to the town of Segni, filtration through porous soils, mode of cooling the *aqua tepula*, and of removing carbonate of lime from water. P. Secchi has found the spring which furnished the *aqua tepula*; its temperature is 17° to 18° C. in winter, and it cannot have been over 18° when the ancients used it; this shows the extreme slowness of cooling in the interior of the globe.—On a remarkable fall of hail observed at Grotta Ferrata, by P. Secchi. The hail cloud appeared like an immense ball of cotton or wool, and it advanced with a whirling movement from south-east to north-west. The first rain drops were very large, at least 1 cubic centimetre. The hailstones which followed were formed of groups of crystals like those of quartz gathered round an irregular mass of ice. These groups weighed 40 to 60 grammes; certain blocks at Marino, 300 grammes. Round grains, with concentric layers, were very few. P. Secchi thinks electricity not the cause but the effect of hail.—On the composition of gun-cotton, by Prof. Abel. This refers to a note by MM. Champion and Pellet.—On a new electric repulsion and its application to the theory of comets, by MM. Reitlinger and Urbanitzky. Operating with air, oxygen, hydrogen, nitrogen, &c., in Geissler tubes, they got, under pressures of 2 to 8 mm., the usual attraction in the luminous column when the finger, or any conductor was brought near; but, pursuing the rarefaction further, a repulsion. Using a tube like an electric egg, the nebulous light was like the tail of a comet, and the repulsion was very strong, and manifest at a great distance.—On the portative force of horse-shoe magnets; extract from memoir by M. van der Willigen. To saturate his magnets he places them vertically with their poles on those of a Ruhmkorff coil, the circuit of which he opens and closes several times; the magnetism in the magnets then reaches its maximum, even supersaturation. After the last opening, he slides the magnet carefully towards the edges of the polar planes of the electro-magnets. Then he puts the well-cleaned support before the magnet, inclining the latter slowly. Immediately the support has joined the magnet, the latter can be removed without effort; its portative force is then nearly a third greater than the permanent portative force of M. von Wetteren's best magnets. This state of supersaturation he makes the starting-point of his researches.—Researches on the vitality of the eggs of phylloxera (second paper), by M. Balbiani. He examines the action of alkaline sulphocarbonates, sulphide of carbon, and empyreumatic products.—Treatment of phylloxerised vines, by M. Boiteau.—On a question of ballistics, by M. Astier.—On the determination of groups formed of a finite number of linear substitutions, by M. Jordan.—On the application of methods of mathematical physics to the study of bodies terminated by cyclides, by M. Darboux.—Construction for a point of the curve of intersection of two surfaces with the centre of the osculating sphere of this curve, by M. Mannheim.—Explanation of actions at a distance; gravitation, electric actions, by M. Picart. He explains all phenomena by matter in motion.—Crystals of gallium, by M. Lecoq de Boisbaudran. These are octahedra truncated at the base; the angles indicate a clino-rhombic form.—Note on the determination of sugars by means of titrated liquors, by M. Perrot.—Second note on testing for fuchsine in wines, by M. Fordos.—Researches on the real origin of nerves of general sensibility in the medulla oblongata and the spinal chord, by M. Pierret.—On the physiological action of temperatures below zero, on silk-worm grains, by M. Duclaux. To the limit, at least, of − 10°, the effects produced on the grain by lowering the temperature are comparable in their nature, and differ only in their intensity; this intensity does not increase or decrease regularly with the temperature, but presents a maximum for a certain point of the thermometric scale. This physiological zero of the grain is probably a little above the ordinary zero.—On the structure of the optical system in crustaceans, by M. Chatin.—Synoptic table showing the distribution of fossil molluscs in the Tertiary layers of the Paris valley, by M. Meunier.—On a crystallised silicate of baryta obtained artificially, by M. Pisani.—On the study of the barometer, by M. Wickenheimer. 1. The mean of barometric observations, made at any hour for all the days of the month, gives a constant number, whatever the hour. 2. The barometric height passes two maxima and two minima daily. 3. The annual barometric mean is constant for all hours of the day.—Observation of descending trombes, made at the Cape of Antibes, November 21, 1876, by M. Ferreri.

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